

CLIMATOLOGICAL DATA FOR NOVEMBER, 1911.

DISTRICT No. 4, THE LAKE REGION.

Prof. HENRY J. COX, District Editor.

GENERAL SUMMARY.

Within the Lake region November, 1911, was one of the stormiest and most disagreeable months of that name on record. Most of the atmospheric disturbances which swept the district during the month were accompanied by high winds dangerous to navigation, and, with the persistent rain or snow, interfered much with communication of all kinds. Several of these storms were of exceptional character, and the periods of their passage marked the times of the most pronounced temperature changes, the greatest precipitation, and the heaviest blows. Destructive thunderstorms of tornadic type occurred in several localities, doing much damage to buildings and trees, injury to persons, and in some cases occasioned loss of life. These conditions, together with the low temperatures that prevailed during most of the intervals, rendered outdoor work difficult, especially throughout the second and third decades, and in northern Indiana and northern Ohio prevented the harvesting of much of the corn that remained on the stalk. In the latter section there was a considerable loss of potatoes and sugar beets as well.

The degree of cloudiness over the district was remarkable, even for November. The mean values for the district show ordinarily from 30 to 45 per cent of the amounts of sunshine possible, yet throughout most of lower Michigan, the eastern portion of Wisconsin, the region along the southern shore of Lake Erie, and that east of Lake Ontario, the actual amounts of sunshine received during the month were from 10 to 13 per cent lower. No regular Weather Bureau station within this area reported more than 3 clear days nor less than 20 cloudy days.

The following table summarizes the chief features of meteorological interest in the various portions of the district:

	Mean temperature.	Departure from normal.	Mean precipitation.	Departure from normal.	Greatest 24-hour precipitation.	Mean snowfall.	Mean number of days.				Prevailing wind direction.
							Precipitation.	Clear.	Partly cloudy.	Cloudy.	
Minnesota.....	20.4	-6.9	1.54	+0.41	0.61	12.4	8	10	11	9	W.
Wisconsin.....	28.7	-5.2	2.99	+1.08	1.68	11.1	9	8	8	14	W.
Illinois.....	35.4	-3.8	3.27	+0.77	1.51	1.2	14	5	14	11	W.
Indiana.....	34.9	-5.3	3.16	+0.97	1.75	7.7	11	9	8	13	SW.
Upper Michigan.....	27.5	-4.0	3.90	+1.41	1.92	26.7	12	6	7	17	SW.
Lower Michigan.....	34.0	-2.7	3.53	+1.00	2.18	9.6	11	5	8	17	SW.
Ohio.....	36.6	-3.4	3.13	+0.51	1.35	5.6	11	6	9	15	SW.
Pennsylvania.....	38.0	-3.1	3.14	-0.47	0.88	12.2	19	1	6	23	SW.
New York.....	33.7	-2.4	2.65	-0.43	1.75	11.5	13	5	8	17	W.
Vermont.....	33.3	-0.9	2.17	-1.01	0.61	6.8	12	4	8	18	S.

TEMPERATURE.

The mean temperatures of the month were below the normal throughout the entire district, decreasing from near seasonal values in the Champlain Valley to averages showing departures of more than -6° in the extreme northwestern sections, where the month was one of the coldest Novembers on record. This distribution of temperature was due mainly to the course of the various pressure areas. As a rule, the areas of high atmospheric pressure passed to the southward of the Lake region, losing influence in their progress from west to east, while most of the depressions traversed the path across Lake Michigan to the St. Lawrence, leaving the Lake Superior sections entirely within the sweep of north to northwest winds.

Cool weather was general at the opening of the month and temperatures below normal continued until the 5th. On this date, under the influence of an atmospheric depression which approached from the west, the temperature rose above the normal and remained so until the opening of the second decade. On the 10th-11th the passage of a trough-like storm caused high southerly winds which sent the temperature up to the maximum readings for the month of 70° to 79° in all portions of the district except the extreme northwest and extreme east. With the shift of the wind to northwest, following the passage of the storm, the temperature fell as rapidly as it had risen, and within 24 hours the drop was at many places between 55° and 60° , causing one of the severest November cold waves of recent years. At most stations from upper Michigan to Ohio the extreme range of the month occurred during this time. In New York and Vermont, however, the lowest temperatures were not experienced until the 17th, while in the region around the western end of Lake Superior the highest readings occurred on the 7th-8th.

After the passage of the storm referred to above, cool weather was general practically until the end of the month, although two or three warm days occurred in various portions of the district in advance of the storms of the 16th-18th and 26th-28th.

The mean daily range in temperature was very small for November, averaging less than 12° over the middle sections of the district, and generally less than 15° elsewhere in the Lake Region. The high wind movement of the month and the excessive cloudiness, which resulted in a material lessening of daytime heating and nocturnal radiation, explain in a large measure the reason of the comparatively small limits of temperature oscillation, notwithstanding the wide ranges recorded in several particular cases. The absolute range for the district as a whole was 95° , from 79° at Howe, Ind., on the 11th, to -16° at Stephens Mine, Minn., on the 16th.

PRECIPITATION.

Precipitation was frequent—almost continuous—during November, with the exception of the 2d–5th. In fact there was no day in the entire period on which precipitation did not fall at a number of stations in the district, and the average number of days with rain or snow ranged generally from 15 to 20. While the month was practically one long, rainy period, yet as a rule the individual falls were light, and no instances of 24-hour falls exceeding 2 inches were reported, except in lower Michigan, where at five stations from 2 to 2.18 inches occurred. However, precipitation was decidedly more pronounced on the 6th, 11th–12th, 17th, and 28th, in connection with the storms mentioned elsewhere.

Over the sections lying to the west of the Pennsylvania portion of the district, the total precipitation was in excess of the normal, the departures reaching +2 inches in the northern counties of lower Michigan and in some portions of upper Michigan. In the northern Adirondacks also an excess of precipitation was received; but generally throughout the remainder of New York State lying in District No. 4 and the Champlain watershed, notwithstanding the frequency of rain or snow, there was a deficiency, reaching 1 inch along the southern and eastern borders of the district.

Snow.—Owing to the prevailing low temperatures during the month, a far larger proportion of the precipitation fell as snow than is usual for November. In most localities from Ohio westward the fall was the greatest on record for this month of the year, and it was exceptionally heavy in many portions of the eastern sections. The total depths ranged from 3 inches or less on the southern and southwestern boundary to more than 40 inches in upper Michigan and the highlands of New York. There was in many places considerable irregularity in the distribution of the snowfall. At Carvers Falls, N. Y., near the southern end of Lake George, no snow fell during the entire month, while at Nehasane, in the Adirondack region of the same State, the amount recorded was 47.3 inches. On the night of the 2d an unprecedented fall of 18 inches occurred at South Bend, Ind., although there was but little or none at any of the surrounding stations on that date.

At the end of the month from 10 to 30 inches lay on the ground in the interior of upper Michigan, and from 5 to 10 inches over the remainder of the Lake Superior region and in the highlands of lower Michigan. Sleighing was continuous at Duluth, Minn., after the 14th, and at Alpena, Mich., after the 23d. The depths decreased rapidly to the southward, however, and the ground was bare over the southern portions of the Lake Region at the close of the period.

SEVERE STORMS.

As stated above, several of the storms of the month were of exceptional severity.

First decade.—The storm of the 1st–2d occurred in advance of a large area of high pressure which moved down the Missouri Valley, and was caused primarily by an apparent redevelopment in the middle Lake Region of a depression that had traversed that section on the previous day. The storm affected chiefly the northern portions of the State of Michigan, and was accompanied by high northwest winds, driving snows, and temperatures from 10° to 16° below the normal. Vessels at many ports on Lakes Michigan and Huron were unable to make their regular trips, and train schedules were generally abandoned because of the drifted roadbeds.

The storm of the 5th–7th, which passed northeastward across middle Wisconsin and northern lower Michigan, caused winds of only moderate strength, but deserves mention here because it marked one of the periods of heavy precipitation.

Second decade.—The storm of the 11th–13th was by far the most severe disturbance of the month, and its influence was felt practically throughout the whole of the district. It appeared as a low-pressure area on the north Pacific coast as early as the 5th, and during the following few days moved eastward, developing gradually into a trough-shaped depression that occupied, on the morning of the 10th, a line curving from western Lake Superior through Wisconsin, Iowa, Nebraska, and Kansas to central Colorado. The movement of this depression was very slow, and by the evening of the 11th the northern end had barely reached the Straits of Mackinaw, while the line of trough had straightened somewhat and extended southwestward to eastern Texas.

Brisk to high southerly winds held steadily in the front of the disturbance, and the temperatures rose generally into the 70's, giving in many places the highest maximums of November record. Heavy rains accompanied the high temperature, and numerous thunderstorms occurred, no less than 24 being reported from the State of Michigan alone. A number of these thunderstorms were of true tornadic type, that at Owosso, Mich., which is described in a separate article, being of extreme severity for this section of the country. The counties of Calhoun, Eaton, Ingham, and Shiawassee in Michigan suffered much damage from local storms that attended the general disturbance. At Waterloo, Ind., the opera house was demolished, nearly 100 buildings overturned or otherwise damaged, and a number of freight cars untracked. The losses at this place are estimated to aggregate nearly \$125,000. The Fort Wayne (Ind.) News of November 13 says:

The tornado struck the town (Waterloo) at 11 o'clock Saturday night. The path of the tornado was from southwest to northeast and was about 200 feet wide, and the storm took every building that came in its swath. The only warning of the storm was a high wind and a hard rain that commenced to fall about 10.30 p. m., and was soon followed by hail and wind of greater velocity.

Damage to the extent of about \$100,000 was wrought also in Porter County, in the northwestern portion of Indiana. A number of houses and barns were destroyed, including the high-school building at Jackson Center, and several injuries and one casualty were reported.

As the middle line of the storm passed, the high winds shifted suddenly to northwest, the rain changed to snow, and the temperature fell rapidly to readings far below the freezing point, resulting in one of the worst cold waves of record for November. Warnings of the impending drop in temperature, however, had been widely spread by the Weather Bureau, and there was ample time for preparation; but, while losses were, as a result, remarkably small, there was necessarily considerable suffering in the crowded tenement portions of the larger cities, and a number of persons lost their lives because of exposure to the cold. The following, in which the Chicago Record-Herald of November 13 sums up the local situation, can well be applied to much of the storm-affected area:

Chicago's weather shattered all previous records in the 24 hours ending at 1 p. m. yesterday.

Never before had the thermometer taken such a drop in so short a time. It fell from 74° to 13° above zero.

Never before had a November 11 been so warm as Saturday, and never before had a November 12 been so cold as yesterday.

Never before in the history of Chicago was one man overcome by heat and two others frozen to death in the short space of 24 hours.

By the morning of the 12th the disturbance had assumed circular proportions and had crossed Lake Huron, and passing out through the St. Lawrence Valley during that day visited the eastern portions of the district with high winds, rain turning to snow, and temperature changes similar to those mentioned above.

As a result of the warnings of the Weather Bureau practically all shipping remained in port or sought shelter before the storm struck.

The storm which crossed the district on the 17th-18th traversed southern Wisconsin, the northern portion of lower Michigan, thence swerving slightly toward the mouth of the St. Lawrence. The temperature changes were not so pronounced as were those of the previous disturbance, but high northwest winds, with freezing rain, and sleet and snow caused much damage over the northern and western portions of the district. A number of boats, especially in northern Lake Huron, were crippled, and several cases of foundering were reported. There was also a more or less complete interruption of telegraph and telephone communication in many localities, while electric-light and power service suffered badly.

Third decade.—The storm of the 26th-28th was not so general as those of the second decade, but was accompanied by considerable precipitation in the southwestern portions of the Lake region.

ICE CONDITIONS.

In western Lake Superior ice formed exceptionally early in the month. In Duluth Harbor the first formation was on the 13th, which is the earliest of record in 13 years. By the end of the month the harbor was entirely covered with ice ranging from 8 to 12 inches thick, except over the extreme western portion of Superior Bay and where the boats kept channels open to some of the docks. At Houghton the first ice formed in Portage Lake and Portage River on the 14th. On the 18th it was about 2 inches thick at the docks at Chassell, and it was necessary for tugs to keep the channel open to permit the passage of the last lumber boat of the season. On the 24th 5 inches of ice was reported in Torch Lake and Torch Bay, and on the 29th it required nearly 5 hours for a boat to make the 9 miles from Portage Canal to Houghton, and 6 inches of ice was reported at many points in the channel. Over eastern Superior, northern Michigan, and northern Huron some ice was reported during the latter half of the month, but it was not of sufficient thickness to impede navigation, and in most cases was confined to small amounts of shore ice. General navigation closed at Marquette, Mich., on the 29th.

NOVEMBER LAKE LEVELS.

The following data relative to the levels of the Great Lakes during November, 1911, are taken from the report of the United States lake survey office:

Lakes.	Above tide-water, New York.
Superior.....	Feet. 602.06
Michigan-Huron.....	579.36
Erie.....	571.13
Ontario.....	244.50

Lake Superior is 0.17 foot lower than last month, 0.38 foot higher than a year ago, 0.64 foot below the average stage of November for the last

10 years, 1.45 feet below the high stage of November, 1900, and 0.56 foot above the low stage of November, 1879. It will probably fall 0.3 foot during December.

Lakes Michigan and Huron are 0.24 foot lower than last month, 0.44 foot lower than a year ago, 1.09 feet below the average stage of November for the last 10 years, 3.44 feet below the high stage of November, 1885, and 0.18 foot above the low stage of November, 1895. They will probably fall 0.2 foot during December.

Lake Erie is 0.40 foot lower than last month, 0.33 foot lower than a year ago, 0.71 foot lower than the average stage of November for the last 10 years, 2.45 feet below the high stage of November, 1885, and 0.43 foot above the low stage of November, 1895. It will probably fall 0.1 foot during December.

Lake Ontario is 0.12 foot lower than last month, 0.65 foot lower than a year ago, 1.05 feet lower than the average stage of November for the last 10 years, 3.32 feet below the high stage of November, 1861, and 1.69 foot above the low stage of November, 1895. It will probably fall 0.2 foot during December.

TORNADO AT OWOSSO, MICH.

By MR. F. H. COLEMAN, Observer, Weather Bureau.

On Saturday, November 11, 1911, a very destructive tornado swept through a portion of the city of Owosso, Mich., shortly after 11 p. m.

The morning weather map of that date shows a decided disturbance extending in troughlike form from Lake Superior to Texas, with the lowest pressure near Kansas City, where the reduced barometer reading was 29.36 inches. Twelve hours later the center of the storm had moved to Lake Superior, with barometer readings below 29.10 inches. Very mild temperatures prevailed throughout the southern part of Michigan, maximum temperatures in the seventies being quite general. The low-pressure area was followed very closely by an extensive area of high pressure, accompanied by a cold wave.

Mild temperatures continued at Owosso during the early part of the night, and rain began about 10.15 p. m. Suddenly there was a rush and roar of wind, a heavy downpour of rain, and the tornado tore its way through the factory and residence portions of the city, missing the business district by a distance of about two blocks.

Owing to the darkness and rain, very few people saw the tornado and only meager descriptions of its appearance could be obtained. Mr. M. D. Corey had just left his laundry building, adjoining the Main Street Bridge, and had reached the center of the business district, about two blocks distant, when suddenly the streets were filled with flying débris, and on looking back he saw a peculiar formation, slightly luminous below and very black above, which had the appearance of a huge rope writhing and twisting in the air. It seemed to pass directly above the laundry, completely wrecking that structure.

The path of the storm, extending from southwest to northeast, was about 1½ miles long and from 300 to 500 feet wide. However, judging from its effects, the tornado itself was probably not over 200 feet in diameter, but within the limits indicated bounded and rebounded and swung from side to side in a very erratic manner. This is evidenced by the fact that there were limited areas of great destruction, sometimes on one side and sometimes on the other of its general path, while in the intervening areas but little damage occurred.

The first evidence of the tornado was to be found near the southwestern limits of the city, where a group of houses was considerably damaged, one being unroofed and one nearly demolished. Thereafter throughout a space of several blocks of thinly populated territory there was practically no damage. Then the whirl again

touched the ground and overturned the house occupied by Mr. and Mrs. Harry Corwin, both of whom were instantly killed. The overturned house was swung around at a considerable angle with its original position, and the house adjoining was twisted about 4 feet north on its foundation, but the houses across the street to the east sustained only slight damage.

Beyond, another space of about three blocks extending to the Grand Trunk Railway was untouched. At next dip of the tornado several freight cars were thrown from the Grand Trunk tracks, and the full fury of the storm fell upon the upper portion of the Estey furniture factory. This was a three-story frame building, and the two upper floors were crushed and torn into an unrecognizable mass of wreckage. Débris from this building was strewn for hundreds of feet in a northeasterly direction, one section of boarding about 15 by 25 feet being carried over into Main Street, at least 1,000 feet away. There was a veritable rain of splinters of timber and furniture 2 blocks away and one piece of 4 by 6 about 5 feet long was driven through the side of a house nearly 500 feet distant. Had the tornado occurred during working hours there would undoubtedly have been much loss of life at this factory. As it was, the night engineer was the only person in the building, and he fortunately escaped with but minor cuts and bruises. A corner of the brick structure occupied by the Woodard Furniture Co. was next torn out, the bricks falling outward in a southeasterly direction, or toward the center of the storm's path. The full force of the tornado was also felt in the residence block northeast of the Woodard factory. Here the house occupied by Thomas Kerwin and family was wrecked, the only part left standing being the kitchen and a bedroom above. This house shows perfectly the result of the sudden outrush of air within as the vacuum of the tornado reached it, the walls being forced outward in all directions. A scene of desolation extends for one block northeast from this point, every house having sections of walls or roof torn out.

The tornado bounded over the houses between this block and Main Street, then struck and wrecked the City Laundry, unroofed a house nearby, and tore out the southwest corner of a store across the street. A number of large trees 2 blocks west of the laundry were

uprooted and the houses on the street 1 block west greatly damaged.

From this place the tornado crossed the river to the better residence district, where a brick house was unroofed and its walls partly demolished, while nearly all the shingles were stripped from the roof of the house adjoining. Practically all of the residences for one block north of this point had parts of roofs and walls torn away, or were otherwise damaged. There was not much damage sustained by the houses in the blocks on either side, but a score of great trees standing on lawns in the block to the northeast were uprooted. Here the twisting action of the storm was very apparent, as some of the trees on the east end of the block fell toward the northwest, while those on the west end fell toward the northeast.

This place marks the end of the path of serious damage, although the roofs of two churches situated one to two blocks east of the tornado's path were considerably damaged.

Everywhere along its track the storm prostrated trees and poles, and some of the streets were rendered impassable by the entanglement of wires, trees, and débris. Fortunately no fires resulted, partly because the weather had been so warm that heat was unnecessary, and partly because the general rain and moderate to brisk winds preceding the tornado had interfered with the long-distance transmission wires of the Commonwealth Power Co. and the electric current had failed about 15 minutes before the occurrence of the tornado.

The storm was a severe blow to the city, which has a population of about 10,000. Two people were killed and 15 injured, one very seriously. It is fortunate that, owing to the lateness of the hour and the inclement weather conditions, the streets were almost deserted, as otherwise many people would undoubtedly have been injured by the flying débris or falling structures. The property loss is estimated at \$500,000, of which \$150,000 is due to the destruction of the Estey factory. About 110 men were thrown out of employment by the loss of this plant.

There was some damage at points outside of the city; 3 barns 6 miles southwest of Owosso were unroofed or otherwise damaged and some damage was also reported 2 or 3 miles northeast of the town.

TABLE 1.—Climatological data for November, 1911. District No. 4, Lake Region.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.				Sky.				Prevailing wind direction.	Observers.		
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of partly cloudy days.			Number of overcast days.	
Minnesota.																					
Cloquet.....	Carlton.....	800	---	19.7	---	47	7	- 13	16	35	1.10	---	0.60	9.0	6	6	12	12	w.	S. B. Detwiler.	
Duluth.....	St. Louis.....	1,133	40	21.4	- 7.9	40	8	- 2	13	28	2.59	+ 1.01	0.61	16.7	11	4	13	13	nw.	U. S. Weather Bureau.	
Floodwood.....	do.....	1,257	6	---	---	---	---	---	---	---	1.16	---	0.34	7.3	5	16	3	11	w.	M. H. Schussler.	
Stephens Mine.....	do.....	1,500	4	18.4	---	43	8	- 16	16	37	1.40	---	0.24	14.5	9	19	8	3	w.	Oliver Iron Mining Co.	
Two Harbors.....	Lake.....	614	17	24.6	- 6.3	42	7	- 1	13	34	1.40	- 0.20	0.60	10.0	7	6	19	5	sw.	G. W. Watts.	
Virginia.....	St. Louis.....	1,434	17	18.1	- 6.5	43	8	- 14	16	33	1.58	+ 0.42	0.35	17.0	9	10	8	12	nw.	Oliver Iron Mining Co.	
Wisconsin.																					
Appleton.....	Outagamie.....	795	10	29.2	- 6.4	63	11	4	29	29	2.59	+ 0.84	0.80	9.9	11	11	8	11	w.	Wm. O. Thiede.	
Ashland.....	Ashland.....	647	20	26.0	- 5.7	47	8	0	13	29	1.66	+ 0.13	0.67	13.0	9	14	6	10	s.	Sam Wheeler.	
Bayfield.....	Bayfield.....	635	2	27.0	---	46	8	---	13	25	3.03	---	0.67	21.6	10	8	12	10	sw.	John P. Kiel.	
Cecil.....	Shawano.....	804	13	28.6	- 3.2	64	11	3	29	36	2.75	+ 1.14	0.61	15.5	9	5	16	9	sw.	Louis W. Schmidt.	
Crandon.....	Forest.....	1,060	16	24.8	- 4.0	56	11	- 6	16	40	1.85	- 0.20	1.20	12.0	13	2	11	17	w.	Frank Shoemaker.	
Florance.....	Florance.....	1,293	20	26.5	- 3.4	58	11	1	13	37	2.43	+ 0.32	1.24	13.0	5	12	0	18	nw.	Fred S. Evans.	
Fond du Lac.....	Fond du Lac.....	800	25	29.4	- 4.5	70	11	0	29	39	3.68	+ 1.97	1.37	9.5	9	7	6	17	nw.	Geo. W. Marshall.	
Grand River Locks.....	Marquette.....	770	15	29.3	---	09	11	0	29	52	4.26	+ 2.50	1.68	8.0	9	11	3	16	nw.	Jerry Parkinson.	
Green Bay.....	Brown.....	617	25	28.6	- 3.9	66	11	5	13	36	2.54	+ 0.58	0.67	10.3	14	2	9	19	sw.	U. S. Weather Bureau.	
High Falls.....	Marquette.....	810	0	27.4	---	62	11	3	16	43	3.22	---	1.40	16.5	6	1	22	7	nw.	No. Hydro-Elect. Power Co.	
Iron River.....	Bayfield.....	1,096	2	23.6	---	46	10	8	24	32	2.96	---	0.70	29.5	12	14	2	14	w.	Winfield E. Tripp.	
Kewaunee.....	Kewaunee.....	590	2	30.4	---	60	10	5	13	41	3.34	---	1.00	12.9	9	6	6	18	w.	Eugene V. Kimball.	
Manitowoc.....	Manitowoc.....	616	60	31.8	- 4.0	61	11	7	13	40	3.33	+ 1.25	0.86	7.5	9	5	10	15	w.	Johanna Lups.	
Menasha.....	Winnebago.....	764	14	---	---	---	---	---	---	---	2.73	+ 1.56	1.03	7.5	11	10	5	15	sw.	Geo. T. Allanson.	
Menominee Falls.....	Waukesha.....	842	2	30.4	---	71	11	3	29	44	3.31	---	0.86	5.1	12	8	9	12	sw.	Arthur H. Christman.	
Milwaukee.....	Milwaukee.....	681	40	32.2	- 3.9	73	11	9	29	43	2.49	+ 0.51	0.70	2.3	11	8	11	11	w.	U. S. Weather Bureau.	
New London.....	Outagamie.....	762	15	27.6	- 6.5	67	11	1	29	30	2.65	+ 0.85	0.83	10.0	7	9	5	16	nw.	August H. Pape.	
Oconto.....	Oconto.....	590	20	28.7	- 5.6	60	11	4	16	35	2.19	+ 0.12	0.40	13.0	10	9	7	14	w.	Wm. K. Smith.	
Oshkosh.....	Winnebago.....	744	22	27.6	- 7.1	68	11	1	29	39	2.96	+ 1.31	0.60	10.0	7	11	6	13	sw.	Evan Vincent.	
Pine River.....	Waukesha.....	900	16	28.4	- 5.7	67	11	0	29	29	3.22	+ 1.60	1.06	8.4	13	4	12	14	sw.	Geo. H. Carpenter.	
Plum Island.....	Door.....	588	3	32.9	---	54	11	8	13	36	3.31	---	0.98	16.0	9	3	11	16	nw.	Geo. C. Robinson.	
Plymouth.....	Sheboygan.....	843	1	29.9	---	70	11	5	29	38	3.65	---	1.20	9.7	13	9	8	13	w.	Paul O. Feldrappe.	
Port Washington.....	Ozaukee.....	713	18	31.6	- 4.5	70	11	7	29	45	3.28	+ 1.32	0.70	8.5	10	9	4	17	nw.	Richard C. Kann.	
Racine.....	Racine.....	633	14	33.0	- 6.7	74	11	7	29	45	3.56	+ 1.65	0.96	0.8	9	18	2	10	sw.	Daniel Davis.	
Ripon.....	Fond du Lac.....	935	1	28.6	---	67	11	3	29	37	3.78	---	0.71	11.6	10	8	5	17	w.	Ripon College.	
Sheboygan.....	Sheboygan.....	831	12	31.8	- 6.5	59	11	7	13	44	4.00	+ 2.14	1.22	5.0	10	6	13	11	nw.	Louis C. Meyer.	
Sturgeon Bay.....	Door.....	900	12	30.2	- 4.9	57	11	5	13	42	3.67	---	1.26	15.0	9	5	9	16	w.	Adam N. Dier.	
Superior.....	Douglas.....	671	2	22.0	---	42	8	- 2	16	34	1.50	---	0.40	7.2	11	9	8	13	sw.	Edward B. Banks.	
Waupaca.....	Waupaca.....	857	16	26.7	- 6.9	65	11	0	29	31	2.69	+ 0.98	0.81	13.0	7	11	7	12	sw.	James H. Flagg.	
Illinois.																					
Chicago.....	Cook.....	824	41	35.4	- 3.8	74	11	12	13	42	3.27	+ 0.77	1.51	1.2	14	5	14	11	w.	U. S. Weather Bureau.	
Indiana.																					
Auburn.....	DeKalb.....	874	15	33.4	- 5.3	69	11	9	13	38	3.67	+ 1.30	0.90	---	13	10	0	19	sw.	Mrs. Josie B. Kuhlman.	
Berne.....	Adams.....	849	2	35.7	---	71	11	11	13	58	2.80	---	0.87	0.1	11	11	10	9	sw.	Henry M. Reusser.	
Elkhart.....	Elkhart.....	801	9	36.0	---	72	11	11	12	61	3.52	---	1.11	4.0	12	12	6	11	nw.	Dr. Miles Medical Co.	
Fort Wayne.....	Allen.....	856	15	35.2	- 5.4	70	11	10	13	44	3.75	+ 0.81	1.33	4.5	16	3	9	18	sw.	U. S. Weather Bureau.	
Hammond.....	Lake.....	598	20	34.7	- 4.5	77	11	10	13	63	1.92	- 0.39	0.88	4.0	5	7	13	10	---	Carson V. Whitney.	
Howe.....	Lagrange.....	886	6	35.0	---	79	11	10	13	38	2.31	---	1.10	6.0	7	20	0	10	---	James E. Zook.	
South Bend.....	St. Joseph.....	726	18	33.5	- 6.1	75	11	9	13	33	4.98	+ 2.16	1.75	24.5	16	5	8	17	sw.	Henry H. Swain.	
Whiting.....	Lake.....	606	2	35.6	---	75	11	11	13	57	2.31	---	0.91	4.5	8	3	15	12	sw.	D. H. Boyd.	
Michigan, Upper Peninsula.																					
Baraga.....	Baraga.....	623	9	30.2	---	56	3	- 2	28	43	1.70	---	0.50	17.0	7	2	0	22	w.	D. S. S. & A. Ry.	
Bergland.....	Ontonagon.....	1,300	1	24.4	---	44	11	- 5	20	36	3.12	---	0.88	22.4	7	7	14	8	w.	Frank McMonigal.	
Blaney.....	Schoolcraft.....	1,246	23	26.0	- 4.5	42	8	7	13	29	4.59	+ 1.83	1.55	31.5	14	6	4	20	w.	E. S. Grierson.	
Calumet.....	Houghton.....	875	10	26.2	- 6.0	56	11	1	13	40	4.14	+ 1.16	1.05	30.7	16	5	8	17	nw.	U. P. Experiment Sta.	
Chatham.....	Alger.....	610	10	31.6	- 2.1	60	11	4	13	40	---	---	---	---	5	8	2	25	se.	Mrs. Sarah E. McGaw.	
Deer Park.....	Luce.....	555	10	30.4	- 4.2	70	11	5	29	31	2.47	- 0.65	0.30	7.5	9	11	6	13	sw.	Linton Melvin.	
Detour.....	Chippewa.....	622	12	30.6	- 5.4	46	9	13	14	24	3.86	+ 1.31	1.27	21.0	10	3	6	21	w.	John Nolen.	
Eagle Harbor.....	Keweenaw.....	612	38	29.2	- 2.5	53	11	3	13	35	3.43	+ 1.17	1.92	18.1	12	5	6	19	nw.	U. S. Weather Bureau.	
Escanaba.....	Delta.....	1,147	10	23.0	- 6.5	43	10	- 8	20	40	5.56	+ 3.52	1.20	47.5	12	8	0	22	nw.	W. B. Hatfield.	
Ewen.....	Ontonagon.....	610	10	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	Mrs. Lena Truedell.
Grand Marais.....	Alger.....	622	0	31.2	---	50	4	12	12	27	2.90	---	1.20	32.0	6	4	14	12	---	T. A. Green.	
Green.....	Ontonagon.....	668	10	27.4	- 4.2	46	10	8	13	21	3.67	+ 0.87	0.98	23.9	16	5	6	19	nw.	U. S. Weather Bureau.	
Houghton.....	Houghton.....	1,536	14	25.2	- 2.1	57	11	- 12	16	38	5.00	+ 3.43	1.60	40.0	8	7	2	21	w.	D. S. S. & A. Ry.	
Humboldt.....	Marquette.....	1,111	10	29.0	- 3.4	58	11	0	13	48	2.27	+ 0.63	0.62	---	9	7	12	11	nw.	Chapin Mining Co.	
Iron Mountain.....	Dickinson.....	1,504	14	21.7	- 6.9	45	8	- 5	15	32	3.50	+ 1.28	0.60	17.5	9	14	8	8	nw.	Victor D. Laing.	
Iron River.....	Iron.....	1,520	8	23.2	---	41	10	- 4	13	29	6.94	---	1.63	46.0	11	13	3	14	s.	J. V. Brennan.	
Ironwood.....	Gogebic.....	1,536	11	26.0	- 4.3	57	11	- 1	13	30	4.15	+ 1.74	1.00	33.0	16	4	10	16	nw.	Clevid Cliffs Iron Co.	
Ishpeming.....	Marquette.....	610	4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	J. A. Malone.
Isle Royale.....	Keweenaw.....	831	10	30.8	- 4.0	62	12	13	12	49	4.21	+ 1.66	1.12	10.5	9	0	3	27	sw.	M. I. State Park Comm.	
Mackinac Island.....	Mackinac.....	734	40	29.0	- 2.9	60	11	4	13	31	4.68	+ 1.89	1.06	40.0	18	0	16	14	w.	Herman Johnson.	
Maple Ridge.....	Delta.....	581	12	30.2	- 5.6	57	12	4													

TABLE 1.—Climatological data for November, 1911. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.				Sky.					Prevailing wind direction.	Observers.
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of partly cloudy days.	Number of cloudy days.		
Lower Peninsula—Con.																				
Alpena	Alpena	609	38	32.4	- 1.3	60	11	13	13	41	4.63	+ 2.07	1.60	17.0	16	2	9	19	w.	U. S. Weather Bureau.
Ann Arbor	Washtenaw	930	31	34.6	- 2.5	67	11	11	11	13†	2.94	+ 0.35	0.71	3.3	11	4	7	19	sw.	University of Michigan.
Arbela	Tuscola	728	15	33.7	- 4.2	68	12	12	13	50	3.40	+ 0.77	0.85	4.5	9	0	8	22	sw.	Wm. Atkin.
Battle Creek	Calhoun	822	27	34.8	- 3.5	70	11	13	13	51	3.79	+ 1.41	1.12	3.5	10	4	7	19	w.	Elmer E. Sager.
Bay City	Bay	593	15	34.2	- 2.8	70	11	8	15	58	5.56	+ 3.55	2.10	5.6	10	12	8	10	nw.	Pere Marquette R. R.
Benzonia	Benzie	832	15																	J. W. Saunders.
Berlin	St. Clair		25	34.0 ^b	- 2.4	64 ^b	11	15	16	23	3.45	+ 0.81	0.76	9.1	14 ^a	1	12	17	sw.	R. O. Gould.
Big Rapids	Mecosta		15	31.0	- 4.0	66	11	8	13	50	4.45	+ 1.82	1.25	10.0	16	7	5	18	w.	Supt. Water Works.
Bloomington	Van Buren		7	34.9		71	11†	8	13	53	4.78		1.00	6.8	9	9	4	17	sw.	John M. Haven.
Cadillac	Wexford	1,293	2	31.0		66	12	9	13	50	6.43		1.80	22.2	16	5	5	20	sw.	Cadillac Water & Light Co.
Cassopolis	Cass	903	10	36.1	- 1.6	74	11	20	30	40	1.17	- 2.12	0.50	11.0	5	15	0	15	w.	Michigan Central R. R.
Charlevoix	Charlevoix	610	33	34.5	- 2.3	62	11	9	14	27	3.16	+ 0.65	1.03	9.0	8	2	4	24	sw.	Pere Marquette R. R.
Charlotte	Eaton		7	34.0		70	11	4	16	47	2.72		0.73	4.3	7	4	4	22	sw.	City of Charlotte.
Cheboygan	Cheboygan	611	21	30.2	- 4.6	65	11	11	29	33	5.50	+ 2.97	1.20	23.2	8	4	13	13	nw.	E. A. Bouchard.
Clinton	Lenawee	830	21	35.9	- 1.9	67	11†	6	16	47	3.20	+ 0.62	0.90	4.8	10	10	9	11	sw.	David Woodward.
Coldwater	Branch	984	14	36.2	- 2.1	73	11	9	13	52	3.68	+ 0.82	1.20	4.2	9	4	9	17	sw.	Lake Shore & Mich. So. R. R.
Concord	Jackson		6	34.2		71	12	1	16	55	2.15		0.56	5.1	8	8	18	4	sw.	W. N. Armstrong.
Croton	Newaygo	885	3	34.8		70	11	15	13	48	4.00		1.70	1.0	9	2	14	14	w.	G. R. M. Power Co.
Detroit	Wayne	730	40	35.6	- 3.0	65	11	12	13	49	3.58	+ 0.95	0.73	7.0	14	2	13	15	w.	U. S. Weather Bureau.
Durand	Shiawassee	799	4																	H. J. Tobin.
East Tawas	Iosco	590	14	33.0	- 2.9	55	11	10	13	32	2.12	+ 0.16	0.55	5.0	10	16	9	5	w.	Detroit & Mackinaw Ry.
Eloise	Wayne	640	14	36.0	- 2.4	69	12	11	16	47	3.33	+ 1.54	0.64	5.6	13	4	6	20	sw.	John Gilmore.
Flint	Genesee	730	22	34.7	- 1.2	67	11	13	13	46	3.02	+ 0.56	1.03	2.5	9	4	8	18	w.	William L. Fisher.
Frankfort	Benzie	589	7	34.4		64	12	12	13	45	3.96		1.24	16.5	13	2	0	28	w.	Geo. Morency.
Ganges	Allegan	665	2	36.3		78	11	15	13	51	4.41		1.50	15.8	13	2	6	22	sw.	H. H. Hutchins.
Gaylord	Otsego	1,367	11	28.4	- 3.5	63	12	8	13	45	5.80	+ 2.36	1.40	17.0	17	8	0	22	sw.	Michigan Central R. R.
Gladwin	Gladwin	794	15	33.2 ^b	- 2.0	68 ^b	11	9 ^b	13	48	2.25 ^b	+ 0.21	1.20 ^b	4.0 ^b	5 ^b	14 ^b	9 ^b	5 ^b	nw.	Geo. R. Smith.
Grand Haven	Ottawa	628	30	35.9	- 2.1	71	11	15	13	39	4.93	+ 2.40	2.18	8.6	18	3	9	18	w.	U. S. Weather Bureau.
Grand Rapids	Kent	707	22	35.2	- 2.9	72	11	14	13	33	3.88	+ 1.35	1.49	6.2	16	3	6	21	w.	Do.
Grape	Monroe	625	21	35.5	- 3.5	68	12	11	16	50	3.00	+ 0.48	0.89	4.2	10	4	14	12	w.	Joseph W. Morris.
Grass Lake	Jackson	989	5	33.4		66	11	8	16	28	2.74		0.75	9.0	10	10	3	17	sw.	Menzo Conklin.
Grayling	Crawford	1,147	21	31.0	- 3.4	65	11	9	13†	38	5.94	+ 3.30	1.51	19.3	15	2	7	21	nw.	S. N. Insley.
Harbor Beach	Huron	635	23	36.2	- 1.0	64	11†	14	13	44	1.25	+ 0.94	0.35	4.5	8	5	11	14	w.	Pere Marquette R. R.
Harrison	Clare	1,159	18	31.8	- 1.6	68	11	8	13	44	3.71	+ 1.55	1.56		4	6	2	22	sw.	Do.
Harrisville	Alcona	616	27	32.2	- 2.7	60	12	10	13	40	3.74	+ 1.19	0.90	20.0	12	5	5	20	sw.	D. W. Mitchell.
Hart	Oceana	698	19	35.2	- 2.8	75	11†	11	13	55	2.65	+ 0.34	0.45	11.0	11	2	11	17	sw.	Pere Marquette R. R.
Hayes	Huron	620	21	33.0	- 5.4	67	11	10	13	43	4.15	+ 2.35	1.15	7.2	10	3	12	15	sw.	C. F. Leipprandt.
Highland	Oakland	830	19								3.49	+ 0.75	0.62	7.0	14				sw.	A. D. De Garmo.
Hillsdale	Hillsdale	1,150	14	34.0	- 3.4	67	11	6	16	51	4.02	+ 1.12	1.05	9.0	9	12	4	13	sw.	C. L. Herron.
Holland	Ottawa	610	5	36.4		74	11	16	13	50	4.36		1.19	10.0	15	3	13	14	sw.	City of Holland.
Howell	Livingston	924	19	33.4	- 3.2	66	11†	10	13†	51	3.09	+ 0.81	1.00	4.3	12	7	4	19	sw.	Frank Sharp.
Ivan	Kalamazoo		22	30.2	- 3.8	66	11†	6	13	51	4.39	+ 1.77	1.05	27.0	16	4	10	16	w.	O. L. Giddings.
Jackson	Jackson	927	14	34.4	- 2.9	69	11†	7	16	54	3.86	+ 1.59	1.45	4.5	10	6	7	17	w.	City of Jackson.
Jeddo	St. Clair	667	22	33.9	- 3.8	63	11†	11	23	42	2.60	+ 0.12	0.70	6.5	11	6	15	9	sw.	William Bice.
Kalamazoo	Kalamazoo	955	35	34.5 ^b	- 3.1	71 ^b	11	5	12	64	3.13	+ 0.32	0.65	10.5	11	0	16	14	w.	Kalamazoo Asylum.
Lansing (Agr. College)	Ingham	820	47	33.8	- 3.0	68	11	12	16	40	3.40	+ 0.99	0.76	8.2	16	2	6	22	sw.	U. S. Weather Bureau.
Lansing (Capitol)	do	881	24	34.6	- 3.5	69	11	12	13†	49	3.17	+ 0.78	0.87	5.4	14	7	3	20	sw.	State Board of Health.
Lapeer	Lapeer	827	12	34.0	- 3.5	62	11	13	13	27	5.17	+ 3.40	1.00		8	0	24	6	nw.	Michigan Home.
Ludington	Mason	1,586	13	35.2	- 2.6	68	12	9	13	50	1.87	- 0.17	0.49	8.0	13	3	16	11	sw.	Pere Marquette R. R.
Luther	Lake	1,023	1	31.7		69	12	7	13	55	4.18		1.55	8.0	16	5	5	20	w.	John W. Nicholson.
Mackinaw	Cheboygan	1,592	20	33.2	- 2.5	65	11	16	12†	46	4.13	+ 1.62	0.68	28.0	11	3	8	19	nw.	G. R. & I. Ry.
Manistota	Antrim	1,121	15			77	12				4.65	+ 1.91	1.00	46.5	11	5	0	22	nw.	G. R. & I. Ry.
Manistee	Manistee	600	14	35.5	- 1.2	71	11	10	12	40	2.45		0.00	1.40	4	2	16	12	nw.	Pere Marquette R. R.
Marshall	Calhoun	896	0																	E. B. Stuart.
Midland	Midland	604	12	35.4	- 1.5	68	11	11	13	41	0.80	- 0.67	0.30	5.0	4	2	0	28	sw.	Pere Marquette R. R.
Morenci	Lenawee	811	4	36.0		67	11†	12	13	50	3.69		1.06	4.0	11	5	10	15	sw.	George J. Tripp.
Mount Clemens	Macomb	615	11	36.8 ^a	- 2.1	71 ^b	12	13	13	52	2.82	+ 0.51	0.79	4.3	11	11	8	11	sw.	Waterworks.
Mount Pleasant	Isabella	826	12	38.8	+ 2.6	75	11	18	2	33	0.64	- 1.43	0.16	2.0	6	9	7	14	sw.	Pere Marquette R. R.
Muskegon	Muskegon	587	15	36.2	- 2.6	70	10†	11	13	51	3.50	+ 1.17	1.50	5.0	11	11	3	16	w.	G. R. & I. Ry.
Old Mission	Grand Traverse	858	17	32.0	- 4.3	60	11	9	13	38	3.98	+ 1.36	1.25	17.9	15	1	7	22	nw.	E. O. Ladd.
Olivet	Eaton	934	21	33.6	- 3.0	68	11†	12	13†	49	4.15	+ 1.50	1.13	11.3	15	6	5	19	s.	G. A. Knapp.
Omer	Arenac	616	12	29.8 ^a	- 6.5	45 ^a	27	10												

TABLE 1.- Climatological data for November, 1911. District No. 4—Continued.

Stations.	Counties.	Elevation, feet.	Length of record, years.	Temperature, in degrees Fahrenheit.						Precipitation, in inches.						Sky.				Prevailing wind direction.	Observers.
				Mean.	Departure from the normal.	Highest.	Date.	Lowest.	Date.	Greatest daily range.	Total.	Departure from the normal.	Greatest in 24 hours.	Total snowfall, unmelted.	Number of rainy days, 0.01 inch or more.	Number of clear days.	Number of partly cloudy days.	Number of cloudy days.			
Ohio—Continued.																					
Defiance	Defiance	712	17	36.7	- 2.8	67	11†	10	16	50	3.57	+ 0.97	1.08	3.2	10	8	7	15	sw.	John F. Heitschorn.	
Findlay	Hancock	776	22	35.2	- 4.9	69	11	10	13	49	3.32	+ 0.55	0.95	3.5	10	17	8	5	sw.	Dr. E. A. Moser.	
Fremont	Sandusky	628	9	37.8	—	68	11†	12	13	48	2.53	—	0.59	6.5	11	12	6	12	sw.	E. Stanley Thomas.	
Hedges	Paulding	725	17	36.0	- 3.4	67	11†	10	13†	50	4.14	+ 1.81	1.20	6.0	8	9	14	7	sw.	Charles Stutzman.	
Hillhouse	Lake	997	18	35.4	- 3.8	68	12	11	13†	50	3.46	+ 0.16	0.80	10.2	14	5	13	12	sw.	J. W. Doncaster.	
Hiram	Portage	1,260	31	35.8	- 3.0	67	12	11	13	50	3.51	+ 0.40	0.70	9.5	12	7	7	16	w.	Prof. G. H. Colton.	
Hudson	Summit	1,153	50	36.3	- 3.3	66	12	12	13	47	3.14	+ 0.09	0.84	—	13	5	8	17	s.	Dr. W. I. Chamberlain.	
Lima	Allen	875	12	36.0	- 5.4	67	12	11	13	50	3.27	+ 1.43	1.15	3.0	8	6	14	10	sw.	Miss Ollie DeLong.	
Medina	Medina	944	23	36.1	- 4.7	67	12	12	13	39	2.61	+ 0.20	0.65	7.0	12	10	1	19	w.	F. W. Clark.	
Montpelier	Williams	880	19	35.8	- 2.0	68	11†	10	13	50	4.12	+ 1.19	0.98	7.0	10	5	5	20	w.	G. L. Laser.	
Napoleon	Henry	680	24	37.6	- 2.5	68	12	12	13	49	4.00	+ 1.34	1.05	7.0	10	9	11	10	w.	A. C. Senter.	
New Bremen	Auglaize	1,038	18	36.4	- 4.9	68	11†	10	13	52	2.44	+ 0.49	0.70	1.5	8	6	19	5	sw.	Miss Lillian Grothaus.	
North Royalton	Cuyahoga	1,000	18	35.8	- 4.0	66	12	12	13	48	2.83	+ 0.21	0.66	8.0	10	9	9	12	sw.	W. S. Edgerton.	
Northwalk	Huron	719	25	37.7	- 2.8	70	11†	13	13	50	2.91	+ 0.39	0.60	3.0	10	4	7	19	w.	Giles R. Gregory.	
Oberlin	Lorain	855	36	37.6	- 2.3	68	12	13	13	48	2.59	+ 0.08	0.57	6.9	11	8	5	17	w.	Prof. F. F. Jewett.	
Ottawa	Putnam	720	16	37.3	- 3.7	68	11†	11	13	50	2.59	+ 0.15	0.74	1.0	7	4	12	14	w.	Prof. J. T. Maidlow.	
Sandusky	Erie	629	34	37.2	- 3.6	70	12	13	13	55	2.19	+ 0.55	0.70	2.9	12	4	13	13	sw.	U. S. Weather Bureau.	
Tiffin	Seneca	775	29	37.6	- 2.8	69	12	13	13	50	3.66	+ 0.93	0.78	6.5	13	9	10	11	sw.	Prof. T. H. Sonnedeker.	
Toledo	Lucas	769	40	36.9	- 2.8	70	11	13	13	51	3.48	+ 0.83	0.88	3.3	15	10	7	13	sw.	U. S. Weather Bureau.	
Upper Sandusky	Wyandot	854	28	36.5	- 4.5	69	12	11	13	52	3.94	+ 1.27	0.95	9.5	10	4	9	17	sw.	Robert E. Tracht.	
Vickery	Sandusky	588	18	36.8	- 3.2	69	11†	13	13	51	2.42	+ 0.15	0.68	3.6	11	6	10	14	sw.	John W. Barr.	
Wauseon	Fulton	780	39	35.5	- 1.6	68	11	12	13	51	3.83	+ 0.73	1.01	7.1	13	1	16	13	sw.	Thomas Mikesell.	
Willoughby	Lake	649	17	—	—	—	—	—	—	—	2.60	+ 0.13	0.70	3.9	13	3	4	23	w.	C. M. Richardson.	
Pennsylvania.																					
Erie	Erie	658	38	38.0	- 3.1	70	11	16	13	53	3.14	- 0.47	0.88	12.2	19	1	6	23	sw.	U. S. Weather Bureau.	
New York.																					
Adams Center	Jefferson	540	20	35.8	+ 1.1	68	12	3	17	38	4.40	+ 0.92	0.70	22.5	17	5	8	17	nw.	A. E. Cooley.	
Angelica	Allegany	1,340	28	33.0	- 3.0	64	11	12	17	37	1.90	- 0.56	0.33	4.0	18	1	6	23	w.	Charles P. Arnold.	
Appleton	Niagara	270	20	37.4	- 2.1	71	12	17	22	44	1.83	- 1.55	0.40	4.4	13	3	9	18	sw.	H. A. Van Wagoner.	
Auburn	Cayuga	715	42	35.8	- 2.6	67	11	17	17	32	0.78	- 2.25	0.18	5.0	7	5	16	9	nw.	A. H. Underwood.	
Avon	Livingston	585	16	35.5	- 2.9	69	11	14	23	37	1.22	- 0.83	0.44	2.5	7	8	3	19	w.	W. G. Markham.	
Blue Mountain Lake	Hamilton	1,750	11	—	—	—	—	—	—	—	3.37	+ 0.57	0.90	23.0	19	2	4	24	w.	B. F. Merwin.	
Brookport	Monroe	537	15	35.7	- 2.8	69	11	15	22	35	2.41	+ 0.34	0.67	8.5	30	4	12	14	w.	W. H. Lennon.	
Buffalo	Erie	767	60	37.3	- 2.0	69	12	18	13	47	3.58	+ 0.23	0.78	13.6	16	2	10	18	w.	U. S. Weather Bureau.	
Canton	St. Lawrence	448	17	32.7	- 1.2	67	11	7	17	35	3.23	- 0.18	0.67	10.2	17	2	7	21	sw.	Do.	
Cape Vincent	Jefferson	246	6	35.8	—	61	11	16	17	26	3.22	—	0.90	—	14	2	10	18	w.	J. Harry Grapotte.	
Carvers Falls	Washington	243	13	34.6	- 0.7	68	12	16	23	31	2.02	- 0.20	0.75	0	3	11	7	12	s.	Washburne Fancher, C. E.	
Chazy	Clinton	151	11	33.9	- 0.0	68	9	12	17	34	0.75	- 0.77	0.25	2.0	5	5	11	14	s.	W. R. North.	
Dannemora	do	1,490	6	30.3	- 6.2	62	12	9	17	29	2.04	- 0.46	0.46	8.0	15	4	5	21	sw.	Dr. W. N. Thayer.	
Elba	Genesee	500	12	33.6	- 4.4	67	11	12	17	30	2.18	+ 0.11	0.30	17.0	10	7	9	14	sw.	Joseph S. Willford.	
Faust	Franklin	1,550	0	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	Santa Clara Lumber Co.	
Fayetteville	Onondaga	530	10	36.5	- 1.4	69	11	8	17	30	1.71	- 0.90	0.56	2.0	14	8	6	16	nw.	Dana H. Wells.	
Gabriels	Franklin	1,729	9	29.48	- 5.6	8	—	2	17	34	4.15	- 0.70	0.70	32.8	15	5	5	20	w.	Gabriels Sanitarium.	
Harkness	Clinton	622	9	33.2	- 1.6	63	12	13	17	29	1.14	- 0.36	0.22	2.2	13	18	9	3	w.	J. W. Harkness.	
Hemlock Lake	Livingston	900	13	36.2	- 2.8	63	11	18	13	30	0.74	- 0.95	0.74	3.0	7	6	7	17	s.	D. H. Westbury.	
Hunt	do	1,321	12	35.2	- 3.4	70	11	11	22	40	1.63	- 0.23	0.65	3.0	7	2	10	18	sw.	W. S. Baragar.	
Ithaca	Tompkins	928	33	36.0	- 1.6	67	12	20	13	42	1.28	- 1.30	0.36	2.3	9	6	5	19	se.	W. S. Weather Bureau.	
Keene Valley	Essex	1,000	13	32.0	- 1.9	68	11	3	17	30	3.27	+ 0.65	0.61	8.5	15	6	8	16	nw.	E. R. Wells.	
King Ferry	Cayuga	—	11	—	—	—	—	—	—	—	1.30	- 0.99	0.38	3.7	9	7	3	20	se.	Lucius A. Goodyear.	
Lake George	Warren	350	14	35.8	- 1.2	64	12	12	17	34	3.17	+ 0.10	0.65	4.3	13	2	11	17	w.	Charles Forsell.	
Lake Placid Club	Essex	1,864	3	26.0	- 5.7	11	- 2	17	28	3.59	—	- 0.45	0.45	31.3	20	4	12	14	nw.	Henry van Hoevenberg.	
Le Roy	Genesee	920	21	34.6	- 3.2	69	11	14	13†	43	2.10	- 0.47	0.26	12.4	16	2	7	21	s.	F. W. Ball.	
Lockport	Niagara	650	24	36.0†	- 2.8	68	12	13	22	42	2.09	- 0.28	0.43	10.1	14	5	5	20	sw.	J. E. Wakeman.	
Lowville	Lewis	900	44	30.8	- 3.7	64	11	- 5	17	35	3.25	- 0.19	0.80	12.0	7	8	6	16	w.	Charles J. Rice.	
Molra	Franklin	200	11	32.2	- 2.4	67	11†	14	16	35	2.20	- 0.28	0.75	8.5	10	6	14	10	w.	C. E. McBride.	
Nehasane	Hamilton	1,750	3	28.0	- 6.0	12	- 8	17	35	6.43	—	- 0.95	0.95	47.3	24	5	10	15	s.	L. W. Brown.	
North Lake	Herkimer	1,822	10	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	John P. Redmond.	
Ogdensburg	St. Lawrence	175	27	30.7	- 5.0	62	12	0	17	28	2.25	- 0.29	0.72	1.8	7	5	16	9	sw.	State Hospital.	
Old Forge	Herkimer	1,733	3	28.8	- 6.0	11	- 10	17	35	6.54	—	- 1.75	43.5	24	4	5	21	sw.	Mrs. S. W. Nelson.		
Oswego	Oswego	335	41	36.6	- 2.5	68	11	15	17	37	2.75	- 0.66	0.69	5.6	19	1	6	23	s.	U. S. Weather Bureau.	
Otto	Cattaraugus	1,410	7	34.4	—	64	11	9	13	52	3.02	—	0.90	7.6	11	10	9	11	sw.	William J. Wienk.	
Palermo	Oswego	460	52	—	—	—	—	—	—	—	4.19	+ 0.58	1.50	11.3	13	7	7	16	sw.	E. B. Bartlett.	
Perry City	Schuyler	1,038	31	33.3	- 2.8	63	12	13	23	38	1.44	- 1.16	0.81	4.6	13	3	6	21	nw.	W. H. Jeffers.	
Philadelphia	Jefferson	485	5	33.6	- 6.8	11	2	17	35	4.41	—	- 1.03	15.0	19	2	15	13	se.	E. D. Babcock.		
Potsdam	St. Lawrence	300	35	33.6	- 0.1	68	12	9	17	44	3.37	+ 1.15	0.73	6.2	13	—	—				

TABLE 2.- Daily precipitation for November, 1911. District No. 4, Lake region.

Stations.	Watershed.	Day of month.																														Total.	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30		
Minnesota.																																	
Cloquet.....	Lake Superior..					T.	.10			.10		T.	.10		.10			.60			.10											1.10	
Duluth.....	do.	T.				T.	.40		.11	.39	.02	.26	.02		.61		.28	.34					T.		T.				T.	.15	T.	.01	2.59
Floodwood.....	do.						.17			.22			.34				.31				.12			T.	T.							1.16	
Stephens Mine.....	do.			.22			.10					.21	.06		.09	T.		.24					T.	T.	T.					.18		1.40	
Two Harbors.....	do.						.20			.35	.05	T.			.07	.06		.60					T.							.07		1.40	
Virginia.....	do.			.22			.10			.35		.28	.17		.07			.13				T.		T.		.15			.11			1.58	
Wisconsin.																																	
Appleton.....	Fox.	.03			.02		.36			.10	.18	.65	.01		T.	.01	.03	.80	T.					T.						.40		2.59	
Ashland.....	Lake Superior..	T.					.21			T.		.10	.12		.14	.05		.67	.03					T.					.22	.12		1.66	
Bayfield.....	do.	.10					.40	.21		.08		.18	.48		.25			.67	.10						T.							3.03	
Cecil.....	Fox.	.07			T.		.42			T.	.16	.41	.34	T.				T.			.42		T.	T.	.61	.14			.18			2.75	
Crandon.....	Forest.	T.					.65			T.					T.			1.20	T.													1.85	
Florence.....	Menominee..	T.					.58				.13	.37	T.		T.			T.			1.24								.11			2.43	
Fond du Lac.....	Fox.	.05			T.		.47	.05		.27		.13	.37	T.		.10		.62	T.		.15		T.							.60		3.68	
Grand River Locks.....	do.						.60	.10		.60	.30	.68	T.		T.		.04	.70	T.		.12									.12		4.26	
Green Bay.....	Lake Michigan.	.02			T.		.18			.42	.01	.66	.01		.08	T.	.10	.49	.05	.03	.02		T.						.11	.36		2.54	
High Falls.....	do.	T.			T.		.48			.14	T.	.95	T.		.05		.10	.40	.20		.15											3.22	
Iron River.....	Lake Superior..	T.					.40		T.	.05	.17		.01	.01		.50		.40	.60		.15											2.96	
Kewaunee.....	Lake Michigan.	.27					.21			.41		1.00	T.		.23		.43	.16		.18									.01			3.34	
Manitowoc.....	do.	.02				.35				.50		.86			.05	T.		.80	T.		.10		.05							.45		3.33	
Menasha.....	Fox.	.02			T.		.39			1.03		.87	T.		.04		.03	.19	.01		.04								.02	.09		2.73	
Menomonee Falls.....	Lake Michigan.	T.		T.			.50	.22		.24		.86	.14		.10		.02	.76	T.		.08		.04	.03					.32			3.31	
Milwaukee.....	do.	T.			T.		.51			.29	T.	.70	T.		.04			.07	.21	T.	.06	.02		.02					.02	.55		2.49	
New London.....	Fox.	T.					.49			.30	.38	.14	T.				.83	.21	T.										.30	T.		2.65	
Oconto.....	Lake Michigan.					.25	.02			.37	.15	.20			.10	.20	.40	.20	T.													2.19	
Oshkosh.....	Fox.	T.			T.		.58			.38	.30	.45			T.		.55				.10										.60		2.96
Pine River.....	do.	.01			T.		.72			.50	.41	.07	.03	T.	.01		.04	1.06	.02	.03	.05										.27		3.22
Plum Island.....	Lake Michigan.	.30					.38			.05	.23	.52	.35	T.	.01		.70	.28														3.31	
Plymouth.....	do.	.01			T.		.45	.04		.25	.22	1.20	.01		.05		.01	.59	T.		.09											3.65	
Port Washington.....	do.	T.					.64			.33	.10	.42	.05		.20		.70				.30											3.28	
Racine.....	do.	T.	T.				.50	.06		.03	.60	.16	.96				.77	T.			.08											3.56	
Ripon.....	Fox.	T.					.56	.10		.40	.35	.55			.01		.71	.15		.15												3.78	
Sheboygan.....	Lake Michigan.	T.			T.		.56	T.	.20		.19	.47	1.22	T.	.10	T.	.81	T.		.10			.05									4.00	
Sturgeon Bay.....	do.	.27			T.		.24	T.		.09	.24	1.21	.11	T.	T.	T.	1.26	T.												.16	.09	3.67	
Superior II.....	Lake Superior..						.31	.09		.23	.06	.09	.05		.02	.09		.40	.03										.13			1.50	
Waupaca.....	Fox.	T.					.61			.65		.22	T.			.05	.81			.12									.23			2.69	
Illinois.																																	
Chicago.....	Lake Michigan.	T.				.10	.31			.12	.01	1.48	.03		.06	T.	.28	.50	T.	.06	.03		.02	T.	.01	T.			T.	.26		3.27	
Indiana.																																	
Auburn II.....	Maumee.....	.10	T.				.26	.21			.10		.80		.11		.29	.90			.18	.04		T.	.15	T.			.50	.03		3.67	
Berne.....	do.	T.					.50			T.	.04		.50	T.	.14		.87				T.	.04		.44	.04					.16	.03	2.80	
Elkhart.....	St. Joseph.	.28					.43	.07			.19	.03	1.11		.12		.41				T.	.12		.44	.04					.47		3.52	
Fort Wayne.....	Maumee.....	.01	T.				.53			.04	.04	.63	.19		.20	.01	1.33		.08	.04	T.			.13	.16							3.75	
Hammond.....	Lake Michigan.						.82								.02	.10	.88												.06			1.92	
Howe II.....	St. Joseph.		.10							.18					.20		1.10				.30			.10						.33		T.	2.31
South Bend II.....	do.	.02	1.75	T.			.18	.12		.17			1.04	.07	.18		.36	.21		.11	.05			.04	.08	T.				.50	.10		4.98
Whiting.....	Lake Michigan.						.30			.19		.91			.10	.02		.45			T.	.07								.27			2.31
Michigan, Upper Peninsula.																																	
Baraga.....	Lake Superior..	.10											.30				.10	.20	.50										.30			1.70	
Bergland.....	Ontonagon.	.32					.18							.60			.65	.88	T.					T.					.27	.22	T.		3.12
Blaney.....	Manistique.																																
Calumet.....	Lake Superior..	.20					.73	.38		T.		.37	.32	.08	.02	.14		1.55	.32	.08				.12	T.				.12	.16		4.59	
Chatham.....	do.	1.05					.06	.09	.05	.09	.06	.64	.48		.16	.11		.21	.44		.18		.02		.12							4.14	
Deer Park.....	do.	.30					.30	T.				.80	T.	T.																			
Detour.....	St. Marys.	.10							.30				1.00		.30	.24		.21	.10	.18									.15			2.47	
Eagle Harbor.....	Lake Superior..	.17					1.27			.04		.45		.20	.05	.12		.95	.35	T.			T.	T.	T.				T.	.26		3.86	
Escanaba.....	Lake Michigan.	.06					.49			.03	.16	.45	.09	T.	.13	.01	.35	1.58	.04	T.			T.	T.	T.				T.	.04		3.43	
Ewen.....	Ontonagon.	.30	T.				.10	T.		T.		.11	.60	.80	.30		.10	.60	1.20		T.		T.	T.	.30				.30	.85		5.56	
Grand Marais.....	Lake Superior..																																
Green.....	do.	.60					.50					.10	1.20				.10	.40														2.90	
Houghton.....	do.	.21					.82	.17		T.	.02	.46	.29	.02	.07	.08		.76	.46	T.			T.	.05				.02	.08	T.	.04		3.67
Humboldt.....	Escanaba.	.30					T.	T.		T.		1.00	.10		.65	.25		1.40	1.60										.12	.04		5.00	
Iron Mountain.....	Menominee..	.07					.49			T.	.15	.09	.06		.40	.09		.62														2.27	
Iron River.....	do.	T.					.40			.40	.30	.50	T.		.40	.10		.60	.50	T.												3.50	
Ironwood.....	Lake Superior..	.98					.17	.13		T.	.31	.86			.37		1.22	1.63											.15	1.04		6.94	
Ishpeming.....	Escanaba.	.40					.30	.1																									

TABLE 2.—Daily precipitation for November, 1911. District No. 4—Continued.

Stations.	Watershed.	Day of month.																														Total.
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	
Michigan, Lower Peninsula—Con.																																
Berlin	Clinton	T.	.06			.76			T.	.26		(*)	.68	.12	.07		.57	.09	.02	.21	T.		.10	T.	.01			.47	.03		3.45	
Big Rapids	Muskegon	.06	.10		.17	.02	.32	.10		.21	.23	1.25					.74	.10	.30	.10	.05		.30					.40			4.45	
Bloomington	Lake Michigan	T.	1.00				.50	.10		T.	T.	.40	T.	T.	T.	T.	.60	T.		.50	T.	.28		1.00				.40	T.		4.78	
Cadillac	Manistee	.10				.40	.21	.16			.22	.41	1.80	.30	.10	.10		.40	.28	.60			.80	.10				.45			6.43	
Cassopolis	St. Joseph	.50					.02														.40							.05	.20		1.17	
Charlevoix	Lake Michigan	.20					.60	.37				.28	1.03				.18											.30			3.16	
Charlotte	Kalamazoo						.24	.10				.73		T.	.30	.20		.69				.13						.53			2.72	
Cheboygan	Cheboygan	.35	T.	T.	T.		.30	.25			.40	.60	1.20	T.	.60	.20		.60	.95		T.	T.	T.	T.		T.		.45			5.50	
Clinton	Raisin						.51	.10			.40	T.	.51		T.	.10	.05	.90				.14				T.		.45			3.20	
Coldwater	St. Joseph	T.	.02				.52				.40	.80					1.20	T.		.17					T.			.51	T.		3.68	
Concord	Kalamazoo	T.					.56				.32	.25		T.	T.		.11					T.			T.			.40			1.64	
Croton	Muskegon	T.			T.		.51	.14			.15	.31	1.70	T.	T.	.10		.45	T.		T.			.42	T.			.22	T.		4.00	
Detroit	Detroit	T.	T.				.73	.01		.08	.21	T.	.70	.20	.23	T.		.63	.02		.14	T.		.28	.02	.03		.30			3.58	
Durand	Saginaw																															
East Tawas	Lake Huron	.05					.25				.05	.50	.20		.10			.35	.05				.02					.55			2.12	
Eloise	Rouge	T.					.62	.01			.30		.57	.04	.03	.25		.64	T.	T.	.20	T.		.19	.05	.10		.33			3.33	
Flint	Saginaw		T.				.45	.08		.02	.35		1.03		.04			.50			.25							.30			3.02	
Frankfort	Betsey	.30	.10				.30						1.24	.10	.30	.20		.82	.20				.15				.20				3.96	
Ganges	Lake Michigan	.09	.30				.20	.08			.20	.11	1.50					.74				.05		.05		.51		.48			4.41	
Gaylord	Cheboygan	.58	T.		.10	T.	.23	.32			.06	.22	1.40	.25	.20	.08	.05	.72	.39	.01	T.		.10					.79			5.80	
Gladwin	Saginaw						.20			T.		1.20	.40					.30					.15								2.25	
Grand Haven	Grand	.25	.05		T.		.39	.04		.07	.07	2.12	.15	.01	.14	.01		.91	T.	.05	.11	T.	.09	.14	.02			.31			4.93	
Grand Rapids	do.	.10	T.		T.		.40	.04			.06	1.19	.69	.01	.06	.01		.61	T.	.01	.04		.09	.09	.01			.34			3.88	
Grape	Raisin						.50	.01			.15		.89		.09	.04		.67			.18		.20	T.				.27	T.		3.00	
Grass Lake	Grand	T.	.08				.48	.08			.30		T.		.10	.35		.75	T.		.15		.08					.37			2.74	
Grayling	Au Sable	.55			.52				.30			1.51	.25	.05	.19	.09		.70	.28	.08	T.	T.	.30	.27	T.		T.	.40	.45		5.94	
Harbor Beach	Lake Huron		.05				.30	.05				.10			.10			.35		.10									.20		1.25	
Harrison	Saginaw						.67					.44	1.56																		3.71	
Harrisville	Lake Huron	.90	.20				.34	T.			.15	.10	.20		.20	.20		.30	.10				.20					.85			3.74	
Hart	Pentwater	.30					.28	.30			.32		.45	.30	.10	.10		.30				.10						.10			2.65	
Hayes	Pigeon		.20				.15				.60		.65		.10	.10		.70	.20				.05					.40			4.15	
Highland	Huron						.45	.31			.34		.48	.10	.10	.10	.10		.54			.10				.05		.62	.10		3.49	
Hillsdale	St. Joseph	T.	T.				.47	.08			.30	T.	1.05	.05	.20			.85			.20								.82			4.02
Holland	Lake Michigan	.28	.19				.34	.12			.07	1.19	T.		.25	.05	T.	.90	T.		.15	.10		.30	.10			.30			4.36	
Howell	Saginaw	.05					.63	.09			.22	.33		.07	T.			1.00	.02		.05		.02	.01	T.			.60			3.09	
Ivan	Manistee	.35	.12		.02		.16	.14		.05	.27	.35	.60	T.	.20	.10		1.05	.10			.08		.20	T.			.60			4.39	
Jackson	Grand	T.	.10				1.45				.21		.75		.03	T.		.74	T.		.10			.03	.05			.40			3.86	
Jeddo	St. Clair		.10				.70	T.			.30		.49	T.	.02	.12		.29	.10	T.				.13		T.		.25	T.		2.60	
Kalamazoo	Kalamazoo	.30					.45	.12			.16		.35		.15	.10		.65	.05		.30		.15					.40			3.13	
Lansing (Agr. Col.)	Grand	.03					.40	.03		.16	.02	.65	.55	.05	.11	.01		.76	.05		.05	.01		.01				.51			3.40	
Lansing (capitol)	do.	.03	.05				.32	.05			.22		.87	.05	.10	.02		.78	.05		.05	T.		T.	T.			.51	.07		3.17	
Lapeer	Saginaw						.75	.15				.80	T.		1.00			.55	1.00		.30							.62			5.17	
Ludington	Pere Marquette	.05	.10				.15	.05			.07	.11	.49		.10	.20	.20	.15	T.				T.					.15			1.87	
Luther	Manistee	.01	.02	T.	T.		.21	.18		T.	.31	.29	1.55	.01	.02	.11	T.	.80	.11	.17		.07	T.	.06	T.			.26	T.		4.18	
Mackinaw	Lake Huron	.50			.10		.68	.10			.31	.55	.20	.10	.60			.60										.60			4.13	
Mancelona	Lake Michigan	.80			.15		T.						.20	.40	.60	1.00		.60	.40	.10								.30			4.65	
Manistee	Manistee						T.	.45				.20	1.40		.40																2.45	
Marshall	Kalamazoo						.20				.10		T.	T.		.20	.30		1.06			.16		.15				.55	.01		0.80	
Midland	Saginaw	T.					.64	.01			.17	T.	.80		.08	.06		.58	T.												3.69	
Morenci	Maumee						.79				.25		.52	.02	.01	.02												.30			2.82	
Mount Clemens	Clinton	T.	T.				.07			.10								.16														0.64
Mount Pleasant	Saginaw		.10	.11			.06																									3.56
Muskegon	Muskegon						.19	.05			1.00		.06		.10	.20		1.50			.10			.06	.08			.30				3.93
Old Mission	Lake Michigan	.47	.09		.02		.49	.38			.12	T.	1.25	.38	.08	.15	.10		.36	.17				.02				.43			4.15	
Olivet	Kalamazoo	.14					.20				.12	T.	1.13	.05	.26	.02		.81	.02	.01	.21			.02	.01			.20			1.15	
Omer	Lake Huron						.40	.50				1.80		.30	.30			.60	.20									.50			5.40</	

TABLE 2.—Daily precipitation for November, 1911. District No. 4—Continued.

Stations.	Watershed.	Day of month.																														Total.		
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30			
Ohio—Continued.																																		
New Bremen.	Maumee.						.31			T.	.17		.46		.05	.10		.70			T.			.47	T.					.18		T.	2.44	
North Royalton.	Lake Erie.	.11					.46				.05		.66		.15	.10		.62			.10			.10	.50					.13	T.		2.83	
Norwalk.	do.						.30				.37		.57		.15			.60			.30			.38	.10					.09	.05		2.91	
Oberlin.	do.		.11				.31	T.		T.	.03		.57		.10			.52			.30			.17	.22	.03					.23		2.59	
Ottawa.	Maumee.						.38						.48		T.	T.		.74	.05		.17			.49	T.					.28	T.		2.59	
Sandusky.	Lake Erie.		T.				.10	T.		T.	.06		.45		.10	T.		.70		.01	.12	T.		.49	T.	.03	.02			.08	.03		2.19	
Tiffin.	Sandusky.	.01	T.				.56	T.		T.	.02	.01	.65		.20	T.		.78	.27		.16	T.		.65	.10					.15	.10		3.06	
Toledo.	Maumee.		T.				.82	.06		.02	.04	.02	.59		.19	T.		.88		.02	.09	T.		.41	.02	.02			T.		.27	.03		3.48
Upper Sandusky.	Sandusky.		T.				.35	T.			.10		.95		.30	T.		.95				.10	T.	.75	.14	.10				.20			3.94	
Vickery.	Lake Erie.		T.				.21				.07		.40		.15	.01		.68	.03			.17		.55	.05					.10			2.42	
Wauseon.	Maumee.	T.					.63	.12			.16		1.01		.18	.02		.90			.15	.02		.19	.04	T.				.34	.07		3.83	
Willoughby II.	Lake Erie.		T.				.16	.03		.02	.05		.70	.03	.14			.64	.06			.21			.41	.05	.10						2.60	
Pennsylvania.																																		
Erie.	Lake Erie.	.15	T.				.12	.10		.01	.07	T.	1.02	.07	.02	.04	T.	.61	.10	.10	.08	.03		.12	.20	.03				.13	.14		3.14	
New York.																																		
Adams Center.	Lake Ontario.	T.	.20		.11		.47	.21	T.			.04	.41	.70	.30	.20		.05	.46	.20	.30			T.	.16	T.	.20			.19		.20	4.40	
Altman.	do.						.07	.22		T.	.04		.20	.14	T.	.02	.09	.15	.38	.06	.04	.05			.21	.05	T.			.08	.07		1.90	
Angelica.	Genesee.		.07				.11	T.			.08		.17	T.	T.	.27	.26	.40	.01	.06	T.		.09		.15	.05				.16			1.83	
Appleton.	Lake Ontario.		.02				.40	T.					.12		.18	.06	.06	.08						T.	T.	T.				T.			0.78	
Auburn.	Oswego.		T.				.10	T.					.12		T.	.05	.05	.18					T.	.20	T.	T.				T.	T.		1.22	
Avon.	Genesee.	T.		T.			.33	.10			.20	.17	.15	.20	.20	.10	.10	.10	.10	.90	.10	.10		T.	T.	T.				.05	.05	.05	3.37	
Blue Mountain Lake.	Raquette.	T.	.20	T.	T.	T.	.20	.30	T.	.10	.20	.17	.15	.20	.20	.10	.10	.10	.10	.90	.10	.10		T.	T.	T.				.05	.05	.05	3.37	
Boonville.	Black.																																	
Brookport.	Lake Ontario.	.10	.10				.18	.17	.07		.06		.07		.13	.05	.10	.67	.01	.10	.05		.05	.10	.05	.11				.19	.05		2.41	
Buffalo.	Lake Erie.	.01	.03	T.			.12	.09		T.	.18		.65	T.	.08	.36	T.	.50	.30	T.	.22	T.		.07	.03	.58	.02			.34	T.		3.58	
Canton.	Grass.	T.	.21				.29	.24	.01		.08	T.	.51	.10	.05	.11	T.	.12	.57	T.	.08	T.		T.	.06	.09	.27			.32	.12	T.		3.23
Cape Vincent.	St. Lawrence.		.05				.10	.46			.10					.18		.05	.90	.02				.24	.02	.25				.33	.07		2.02	
Carvers Falls.	Lake Champlain.							.75								.52			.75														0.75	
Chazy.	do.		.10										.25			.10																	2.02	
Dannemora.	do.	.03	.10				.31	.24			.03		.12	T.		.21		.46	.02	T.	T.			.06	.05	.08				.18	.14	.01	2.04	
Elba.	Lake Ontario.		.10				.28	.12			T.		.20			.30	T.	.20	T.	.30				T.	.30	.30				.08			2.18	
Faust.	Raquette.																																	
Fayetteville.	Oswego.		.06				.10	.26			.06		.56	.01	T.	.06	.02	T.	.18	T.	.02	.10			.12		.04			T.	.12		1.71	
Gabriels.	St. Regis.		.26				.48	.32			.08		.10	.43		.12	.12		.20	.86		T.		.20	.04	.23				.70	.01		4.15	
Harkness.	Lake Champlain.	.10	.10				.21	.10	.03	.02			.22	.07		.01		.14						.04	.01					.09			1.14	
Hemlock Lake.	Genesee.						.74							T.										T.									0.74	
Hooker.	Lake Ontario.																																	
Horse Shoe.	St. Lawrence.																																	
Hunt.	Genesee.						.25	.29			T.	T.	T.	.10				.65		.20		.10			.22	T.				.04			1.63	
Ithaca.	Oswego.		.03				.36	.05			T.	T.	.25	T.	.09		.01	.25		T.	T.	.02	T.	T.	.22	T.				.06	T.		1.28	
Keene Valley.	Ausable.	.17	.43				.61	.32	.18		.04		.32	.21	T.	.09	.10	T.	.18	T.	T.	.04	T.	T.	.12	T.	T.	T.		.38	.08	T.	3.27	
King Ferry.	Oswego.		T.				.15				.05		.38			.06		.34			.07	.03		.12	.10					.43	.24	T.	1.30	
Lake George.	Lake Champlain.		.03				.65	.11			.05		.35	.31	.02	.05		.62	.20	T.	.07			.11						.28	T.		3.17	
Lake Placid Club.	Ausable, W. Br.	T.	.45	.09			.10	.25	.15		.10		.12	.40		.28	.45		.15	.10	.05	.08			.15	.05	.09			.28	.10	.15	3.59	
Leislers Mill.	Black.																																	
Le Roy.	Genesee.		.15				.17	.26		T.	.04		.22	T.	.03	.20	T.	.22	.22	.07	.20	.07		.02	.10	.07	T.			.06	T.		2.10	
Lockport.	Lake Ontario.	.01	.12				.04	T.	.08				.24		.24		.13	.43	T.	.13	T.		*	.20	.07					.28	T.		2.09	
Lowville.	Black.		T.				.75				.10			.80		.40		T.	.70	T.	T.			T.	T.	T.				.30	T.		3.25	
Moir.	St. Lawrence.		.05				T.	.45	T.				.03	.05		.20	T.	.75					T.	T.	.12	T.	.05			.40	.10		2.20	
Nehasane.	Black.	T.	.07	.03			.10	.80	.34		.11	.01	.50	.95	.07	.39	.22	.02	.74	.45	.04	.10	.03		.33	.04	.23	T.		.19	.55	.12	6.43	
North Lake.	do.																																	
North Osceola.	Lake Ontario.						.65		T.		.10		.40	T.		T.	T.	.72	T.	T.	T.	T.		.10		T.	.18			.10			2.25	
Ogdensburg.	St. Lawrence.		T.				.24	.80	.55		.11		.55	1.75	.09	.61	.30	.05	.75	.07	.01	.07	.01		.29	.02	.11			.06	T.	.03	6.54	
Old Forge.	Black.	.03	.01	.02			.60	.10			.08		.31	.02	.12	.30	.01	.24	.28	.14	.05	.06		T.	.18	.02	.12			.06	T.		2.75	
Oswego.	Lake Ontario.	T.	.03	.03			.90	.70			T.		.30	.30	T.		.09		.04		.20	.10								.16	T.	.03	3.02	
Otto.	Lake Erie.		.20																														4.19	
Palermo.	Lake Ontario.	.03			.05	.20				.10	.60		1.50		.10	.50		.80	.25	.02	.01	T.			T.					T.	.03		4.19	
Perry City.	Oswego.	.02	.08				.26	.09		.03			.31	.05	.10			.18		.04	.06			.17	.05					.41	.32	.02	1.44	
Philadelphia.	St. Lawrence.	.03	.08				.17	.32	.03		.13	T.	.73	.05	.04	.09		T.	1.03	.21	.07	.02			.07	T.	.59			.41	.32	.02	4.41	
Potsdam II.	Raquette.	.38	.16				.46	.08																										

TABLE 3.—Maximum and minimum temperatures for November, 1911. District No. 4, Lake region.

Date.	Duluth, Minn.		Wisconsin.						Chicago, Ill.		Fort Wayne, Ind.		Upper Michigan.										Lower Michigan.						
			Florence.		Green Bay.		Milwaukee.						Escanaba.		Ewen.		Houghton.		Marquette.		Sault Ste. Marie.		Alpena.		Battle Creek.		Cadillac.		
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
1....	25	13	29	18	34	18	36	22	41	26	44	27	32	18	28	17	25	22	30	20	31	19	35	25	42	30	36	25	
2....	33	13	31	17	33	18	34	21	36	23	34	24	35	16	30	19	35	25	33	19	35	19	35	18	32	22	36	19	
3....	37	13	39	17	33	21	36	23	37	25	39	21	38	20	38	14	41	25	42	28	40	23	42	20	40	23	38	22	
4....	32	26	34	26	35	31	38	32	42	34	45	34	36	28	33	23	34	28	34	25	37	29	41	31	41	28	36	29	
5....	39	25	37	29	42	33	49	35	51	39	51	38	43	31	38	19	42	30	41	30	38	31	41	34	49	36	39	32	
6....	37	32	39	29	47	40	50	40	54	45	61	43	44	37	38	32	39	35	41	33	43	37	47	40	52	41	45	34	
7....	37	31	36	34	41	31	44	36	49	40	49	38	43	33	34	32	39	35	41	34	42	38	44	38	49	40	46	36	
8....	40	29	43	26	45	29	47	34	47	38	46	33	42	28	42	23	43	32	44	32	40	30	43	34	48	32	45	32	
9....	38	31	40	31	45	37	49	42	52	40	54	32	43	40	40	32	44	37	44	35	41	30	45	35	50	32	43	30	
10....	38	14	41	34	45	38	54	46	61	51	62	52	47	39	43	28	46	28	46	39	50	35	57	40	59	45	52	38	
11....	32	11	58	33	66	30	73	30	74	32	70	55	53	39	38	30	42	21	60	29	58	35	60	42	70	52	64	40	
12....	11	- 2	44	7	30	6	30	10	32	13	55	11	41	6	32	0	21	12	29	7	55	13	57	16	69	18	66	16	
13....	12	- 2	12	- 1	26	5	27	9	28	12	23	10	19	3	10	- 2	15	8	15	4	21	8	23	13	21	13	19	9	
14....	24	7	28	10	28	24	30	25	33	26	31	21	28	19	29	5	26	13	28	15	29	17	30	23	29	19	26	17	
15....	17	- 1	25	13	28	15	31	17	33	23	33	24	27	12	28	10	23	16	29	16	32	16	34	23	32	26	30	22	
16....	25	4	25	1	31	11	37	16	36	23	31	22	30	11	21	- 4	27	12	27	15	29	15	33	23	29	14	31	19	
17....	30	18	29	22	37	28	46	31	52	33	51	30	34	30	31	21	33	26	33	26	29	24	41	32	49	26	37	24	
18....	25	11	34	21	34	21	31	20	33	23	35	26	31	23	31	22	30	24	30	24	26	22	38	25	45	25	40	24	
19....	25	5	27	20	26	14	32	18	36	22	34	23	29	19	27	8	24	21	30	21	31	25	33	26	30	26	29	24	
20....	22	8	28	4	30	18	33	24	36	28	36	28	32	16	27	- 8	28	21	30	19	34	17	36	19	33	26	31	13	
21....	26	17	29	17	32	19	33	24	35	28	36	25	31	21	25	- 1	28	18	30	23	29	11	32	19	35	27	32	17	
22....	32	24	33	11	37	20	38	28	43	32	40	27	38	21	31	- 6	35	19	38	24	34	26	35	16	35	25	33	19	
23....	26	3	31	16	32	23	35	24	40	26	40	27	33	25	32	19	31	16	33	24	34	21	35	28	36	31	34	28	
24....	20	3	26	15	26	14	28	19	32	24	30	23	27	19	27	7	27	16	25	18	21	11	28	20	31	27	34	22	
25....	38	19	40	20	33	21	39	26	42	28	37	23	32	21	35	19	38	22	39	22	29	20	32	20	36	25	30	21	
26....	33	24	38	27	36	24	43	32	48	34	48	32	37	25	35	21	38	32	37	33	35	29	38	31	41	32	37	25	
27....	32	13	40	30	38	28	46	32	48	39	48	37	37	35	38	23	36	24	36	30	37	30	42	34	43	33	41	29	
28....	13	3	36	18	34	18	38	22	42	25	47	25	36	21	29	13	24	14	30	17	37	10	39	21	44	33	41	20	
29....	34	6	38	5	23	6	24	9	29	17	30	17	37	8	31	1	30	13	36	12	39	8	33	15	34	22	30	18	
30....	37	17	38	15	35	17	34	17	35	20	32	16	40	16	35	7	37	22	38	18	35	13	36	22	32	19	32	22	
Mns..	29.0	13.8	34.2	18.8	35.4	21.9	38.8	25.5	41.9	29.0	42.4	28.1	35.8	22.7	32.0	14.1	32.7	22.2	35.0	22.9	35.4	22.1	38.8	26.1	41.2	28.3	37.8	24.2	

Date.	Lower Michigan.						Ohio.						Erie, Pa.	New York.						Vermont.								
	Detroit.		Muskegon.		Saginaw, West Side.		Cleveland.		Lima.		Sandusky.			Toledo.		Buffalo.		Canton.		Rochester.		Syracuse.		Burlington.		Northfield.		
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.		Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	
1....	43	32	43	29	41	31	47	36	46	37	47	32	48	32	44	40	42	32	32	28	38	32	36	32	34	28	44	28
2....	34	25	40	27	35	22	36	30	40	25	35	28	37	26	41	32	39	26	28	22	33	28	37	26	28	24	30	19
3....	40	24	40	32	43	24	41	29	38	22	42	26	43	24	40	34	42	32	42	21	43	31	42	31	42	27	41	24
4....	42	32	42	31	43	29	47	34	45	31	48	34	47	33	46	38	47	38	44	30	48	32	48	34	44	30	46	22
5....	48	39	45	33	46	36	48	40	45	36	49	40	50	39	49	39	48	39	45	29	47	36	44	32	48	28	48	20
6....	53	40	50	35	50	38	58	43	60	43	60	44	61	42	57	42	55	42	50	33	54	38	53	39	47	29	44	19
7....	47	39	48	40	49	40	51	43	57	43	51	41	49	41	54	43	55	42	54	41	54	41	55	39	54	41	55	38
8....	44	37	49	35	49	34	43	37	45	32	44	37	44	37	44	35	43	39	41	36	43	36	43	38	44	39	43	36
9....	51	39	55	35	49	33	50	36	51	30	49	35	48	36	48	35	50	35	44	30	49	39	49	36	44	34	42	29
10....	60	48	70	45	58	44	62	49	61	48	64	49	63	48	60	45	54	46	51	36	58	45	55	42	47	37	45	33
11....	65	52	70	46	70	48	70	50	66	55	70	54	70	53	70	50	66	53	67	35	70	44	67	45	57	36	56	28
12....	65	16	70	19	67	19	70	18	67	17	70	15	66	15	71	18	69	22	65	27	65	22	64	23	65	32	63	30
13....	21	12	30	11	24	11	22	15	20	11	23	13	23	13	23	16	24	18	27	19	23	18	24	19	32	24	30	21
14....	30	21	33	25	28	21	32	21	32	20	32	21	31	21	34	19	36	23	33	19	34	23	33	23	31	24	29	17
15....	35	23	33	28	36	25	38	29	40	27	38	28	37	26	38	31	36	28	36	28	36	29	34	25	38	29	37	26
16....	32	20	30	22	34	20	31	28	32	18	31	25	31	20	35	30	30	22	30	12	30	23	32	23	36	21	33	16
17....	52	29	40	28	46	28	53	29	53	29	52	30	51	28	51	28	49	22	29	7	34	22	36	16	28	12	31	6
18....	37	28	38	29	42	26	39	29	53	23	39	28																